JRM:lmp 4/25/05

PATENT
Attorney's Matter No. 60049S

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

Hugh L. Brunk
Application No.: 09/587,493
Filed: June 2, 2000
For: USING CLASSIFICATION TECHNIQUES IN DIGITAL WATERMARKING

Examiner: C. Colin

Date: April 25, 2005

Response Under 37 CFR § 1.116
Expedited Procedure
Art Unit: 2136

CERTIFICATE OF FAXING

I hereby certify that theses papers are being facsimile transmitted to the US Patent Office, 703-872-9306 on April 25, 2005.

Joel R. Meyer, Reg. No. 37,677
Attorney for Applicant

APPEAL BRIEF

MAIL STOP APPEAL BRIEF-PATENTS
COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, VA 22313-1450

This brief is in furtherance of the Notice of Appeal filed January 24, 2005. Please charge the fee required under 37 CFR 1.17(f) or any deficiency thereof to deposit account 50-1071 (see transmittal letter).

JRM:lmp 4/25/05

PATENT
Attorney's Matter No. 60049S

I REAL PARTY IN INTEREST

The real party in interest is Digimarc Corporation, by an assignment from the inventor recorded at Reel 011196, Frames 0576-0577, on October 4, 2000.

II RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences.

III. STATUS OF CLAIMS

Claims 1-20 stand finally rejected and appealed.

IV. STATUS OF AMENDMENTS

An amendment after final is filed herewith to make changes to claims 4 and 5 that were inadvertently omitted from the response to the Action dated November 17, 2003. In this appeal, claims 4 and 5 stand or fall with claim 1; and therefore, the entry of the amendment does not materially impact the issue on appeal.

V. SUMMARY OF THE INVENTION

As set forth in claim 1, one aspect of the invention is a method for reading a digital watermark in a media signal. This method assigns sets of media signal samples into classes, computes a statistical distribution of the classes, and uses the statistical distribution to detect or read a watermark in the media signal. See, for example, page 2, lines 3-8, Fig. 1 and text at page 4, line 24 to page 5, line 12, and Fig. 4 and text at page 12, line 1, to page 17, line 8.

As set forth in claim 7 using the statistical distribution may include assigning a figure of merit to a sample indicating a likelihood that the sample includes a recoverable portion of a watermark signal, and using the figure of merit in a read operation. See, for example, page 2, lines 19-26.

As set forth in claim 8, assigning a figure of merit may include assigning a weight to the sample indicating an extent to which the sample is likely to reflect valid watermark data. See, for example, page 2, lines 24-26, and page 14, lines 12-15.

As set forth in claim 9, using the statistical distribution may include assigning a figure of merit to a sample indicating a likelihood that the sample includes a recoverable portion of a watermark signal, and using the figure of merit in a watermark decoding operation. See, for example, page 2, lines 19-26.

As set forth in claim 10, assigning a figure of merit may include assigning a weight to the sample indicating an extent to which the sample is likely to reflect valid watermark data. See, for example, page 2, lines 24-26, and page 14, lines 12-15.

As set forth in claim 12, another aspect of the invention is a method for reading a digital watermark in an image. This method assigns transformed samples of the image into classes using characteristics computed from the samples to group the samples into the classes. The method models a statistical distribution of the samples in each of the classes, and uses the statistical model to decode a watermark from the samples. See, for example, page 2, lines 27-30, Fig. 1 and text at page 4, line 24 to page 5, line 12, and Fig. 4 and text at page 12, line 1, to page 17, line 8.

As set forth in claim 13, the characteristics may comprise signal activity of the samples. In claim 13 method, the signal activity of the samples is evaluated and the samples are assigned to the classes based on signal activity. See, for example, page 4, lines 15-20, and page 9, lines 23-26.

As set forth in claim 15, another aspect of the invention is a method for reading a digital watermark in a watermarked signal. This method assigns samples of the watermarked signal into classes using characteristics computed from the samples to group the samples into the classes. The method computes a statistical distribution of the samples in each of the classes, and uses the statistical distribution to decode a watermark from the watermarked signal. See, for example, page 3, lines 1-4, Fig. 1 and text at page 4, line 24 to page 5, line 12, and Fig. 4 and text at page 12, line 1, to page 17, line 8.

As set forth in claim 16, sets of samples may be assigned to classes based on a signal characteristic of the samples in the sets. See, for example, page 2, lines 9-13. As set forth in claim 17, the signal characteristic may be a measure of signal energy. See, for example, page 2, lines 9-13, and page 12, lines 11-25.

As set forth in claim 19, another aspect of the invention is a method for estimating a watermark signal from a media signal suspected of containing the watermark signal. This method assigns samples of the suspect signal into classes based on a signal characteristic of the samples, models distributions of the classes, and estimates the watermark signal based on the suspect signal, the distributions of the classes, and a distribution of the watermark signal. See, for example, page 3, lines 5-11, and page 15, line 11 to page 17, line 9.

The cited passages are examples only, not intended to limit the scope of the invention.

VI. ISSUES

- Did the Office err in rejecting claims 1-20 under 35 U.S.C. 102(e) as being anticipated by Kankanhalli et al., "Content Based Watermarking of Images," 1998, ACM Multimedia pages 61-70 ("Kankanhalli")?

VII. GROUPING OF CLAIMS

Claims 1-6 and 11 are grouped together and stand or fall together.

Claims 12 and 14 are grouped together and stand or fall together.

Claims 15 and 18 are grouped together and stand or fall together.

Claims 19 and 20 are grouped together and stand or fall together.

Claims 7, 8, 9, 10, 13, 16, and 17 are independently patentable.

VIII. ARGUMENT

Kankanhalli is not a patent or patent publication, and therefore, is not prior art under 35 U.S.C. Section 102(e). In addition, it fails to disclose, teach or suggest all of the elements of the claims as set forth more fully below.

JRM:lmp 4/25/05

PATENT
Attorney's Matter No. 60049S

Claim 1

Kankanhalli fails to disclose, teach or suggest "computing a statistical distribution of the classes; and using the statistical distribution to detect or read a watermark in the media signal" in the novel combination recited in claim 1. While not stated expressly in the Action, the Office appears to rely on Kankanhalli because it discusses a "content based classification" (See page 63, section 2.1, for example). This classification is only used in watermark embedding to compute a threshold of perception to adapt the watermark to the content. Kankanhalli does not use this classification scheme during watermark reading, so to the extent that the Office is relying on it, it is not relevant to claim 1, which expressly recites a method for reading a digital watermark. In particular, Kankanhalli fails to use a statistical distribution to detect or read a watermark as claimed. Therefore, in addition to not being 102(e) prior art, Kankanhalli fails to teach all of the elements of claim 1.

Claim 7

Kankanhalli fails to disclose, teach or suggest using a statistical distribution to detect or read or read a watermark, and in addition, fails to disclose: "assigning a figure of merit to a sample indicating a likelihood that the sample includes a recoverable portion of a watermark signal; and using the figure of merit in a read operation." The Office has failed to point out specifically how Kankanhalli teaches the elements of claim 7. Therefore, one can only assume that the Examiner deemed Kankanhalli to be relevant because it uses the term "classification," which also appears in the specification of the application at issue. Since Kankanhalli's classification method is only used in watermark embedding, Kankanhalli fails to disclose or teach using the claimed figure of merit in a read operation.

Claim 8

Kankanhalli fails to disclose, teach or suggest assigning a weight to a sample indicating an extent to which the sample is likely to reflect valid watermark data as part of a method of

reading a watermark as claimed.

Claim 9

Kankanhalli fails to disclose, teach or suggest using the figure of merit, as recited in claim 9, in a watermark decoding operation. Therefore, it fails to anticipate claim 9.

Claim 10

Kankanhalli fails to disclose, teach or suggest assigning a weight to a sample indicating an extent to which the sample is likely to reflect valid watermark data as part of a method of reading a watermark as claimed.

Claim 12

Kankanhalli fails to disclose, teach or suggest using the statistical model as recited in claim 12 to decode a watermark from the samples.

Claim 13

Kankanhalli fails to disclose, teach or suggest assigning samples into classes based on signal activity for modeling a statistical distribution and using the statistical model to decode a watermark from the samples.

Claim 15

Kankanhalli fails to disclose, teach or suggest: "computing a statistical distribution of the samples in each of the classes; and using the statistical distribution to decode a watermark from the watermarked signal" as claimed.

Claim 16

Kankanhalli fails to disclose, teach or suggest assigning sets of samples to classes based on a signal characteristic as claimed for use in decoding a watermark.

Claim 17

Kankanhalli fails to disclose, teach or suggest a measure of signal energy for use in

computing a statistical distribution that is used to decode a watermark as claimed.

Claim 19

Kankanhalli fails disclose, teach or suggest estimating a watermark from a media signal suspected of containing a watermark, including: estimating the watermark signal based on the suspect signal, the distributions of the classes, and a distribution of the watermark signal.

IX. CONCLUSION

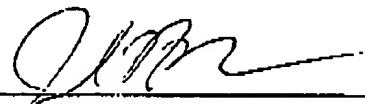
For the foregoing reasons, the final rejection of the claims should be reversed.

Respectfully submitted,

Date: April 25, 2005

DIGIMARC CORPORATION

CUSTOMER NUMBER 23735



By_____
Joel R. Meyer
Registration No. 37,677

Phone: 503-469-4800
FAX 503-469-4777

JRM:lmp 4/25/05

PATENT
Attorney's Matter No. 60049S

APPENDIX
Appealed Claims

1. A method for reading a digital watermark in a media signal comprising:
assigning sets of media signal samples into classes;
computing a statistical distribution of the classes; and
using the statistical distribution to detect or read a watermark in the media signal.

2. The method of claim 1 wherein the media signal is an audio signal.

3. The method of claim 1 wherein the media signal is an image signal.

4. The method of claim 3 wherein the media signal samples are expressed in a frequency domain.

5. The method of claim 4 wherein the media signal samples are spatial frequency coefficients.

6. The method of claim 1 wherein the samples are in a spatial or temporal domain.

7. The method of claim 1 wherein using the statistical distribution includes:
assigning a figure of merit to a sample indicating a likelihood that the sample includes a recoverable portion of a watermark signal; and using the figure of merit in a read operation.

8. The method of claim 7 wherein assigning a figure of merit includes assigning a weight to the sample indicating an extent to which the sample is likely to reflect valid watermark data.

9. The method of claim 1 wherein using the statistical distribution includes:

assigning a figure of merit to a sample indicating a likelihood that the sample includes a recoverable portion of a watermark signal; and using the figure of merit in a watermark decoding operation.

10. The method of claim 9 wherein assigning a figure of merit includes assigning a weight to the sample indicating an extent to which the sample is likely to reflect valid watermark data.

11. A computer readable medium on which is stored software for performing the method of claim 1.

12. A method for reading a digital watermark in an image comprising:

assigning transformed samples of the image into classes using characteristics computed from the samples to group the samples into the classes;

modeling a statistical distribution of the samples in each of the classes; and

using the statistical model to decode a watermark from the samples.

13. The method of claim 12 wherein the characteristics comprise signal activity of the samples, and the signal activity of the samples is evaluated and the samples are assigned to the classes based on signal activity.

14. A computer readable medium on which is stored software for performing the method of claim 12.

15. A method for reading a digital watermark in a watermarked signal comprising:

assigning samples of the watermarked signal into classes using characteristics computed from the samples to group the samples into the classes;

computing a statistical distribution of the samples in each of the classes; and

using the statistical distribution to decode a watermark from the watermarked signal.

16. The method of claim 15 wherein sets of samples are assigned to classes based on a signal characteristic of the samples in the sets.

17. The method of claim 16 wherein the signal characteristic is a measure of signal energy.

18. A computer readable medium on which is stored software for performing the method of claim 15.

19. A method for estimating a watermark signal from a media signal suspected of containing the watermark signal, the method comprising:

assigning samples of the suspect signal into classes based on a signal characteristic of the samples;

modeling distributions of the classes; and

estimating the watermark signal based on the suspect signal, the distributions of the classes, and a distribution of the watermark signal.

20. A computer readable medium on which is stored software for performing the method of claim 19.